Midterm Review 2

1) Given points A(2,3) and B(-2,1), find the equation of the line that passes through A and B in point-slope and slope-intercept form

2) If f(3) = -2 and f(5) = 2
   a) Find the linear function f(x).
   b) What is f(-3)?
   c) What value of x yields f(x) = 32

3) Two oil refineries produce three grades of gasoline: A, B, and C. At each refinery, the three grades of gasoline are produced in a single operation in the following proportions: Refinery 1 produces 1 unit of A, 2 units of B, and 1 unit of C; Refinery 2 produces 1 unit of A, 4 units of B, and 4 units of C. For the production of one operation, Refinery 1 charges $300 and Refinery 2 charges $600. A customer needs 100 units of A, 320 units of B, and 200 units of C.
   a) Write a system of inequalities to model the situation.
   b) Sketch a graph of the feasible region and label <u>all</u> relevant points on the graph.
   c) How should the orders be placed if the customer is to minimize her cost? What is the cost?

4) Solve the following system of equations algebraically using elimination <u>AND</u> using matrices.

$$3x + 2y + z = 8$$
$$-2x + y - 3z = -10$$
$$4x - 3y + 2z = -3$$

5) Telephone numbers in the USA currently have 10 digits. The first three are the area code and the next seven are the local telephone number. How many different telephone numbers are possible within each area code? (Note that at this time, a local telephone number cannot begin with a 0 or a 1.)

6) An ice cream shop has 15 flavors and 6 different toppings. If you choose two scoops and two toppings, how many different bowls (order does not matter) can you make and how many different cones (order does matter) can you make? Assume the order of the toppings does not matter.

7) Solve each equation or inequality. For every inequality, sketch a graph with your solution.
   a) $3[4x - (2x - 7)] < 2(3x - 5)$

   b) $2|3x - 7| = 10x - 8$

   c) $\frac{2}{5}|3x - 3| - 4 > 2$

Answers to Midterm Review2 – Algebra 2:

1) Point-Slope: $y = \frac{1}{2}(x - 2) + 3$ or $y = \frac{1}{2}(x + 2) + 1$
   Slope-Intercept: $y = \frac{1}{2}x + 2$

2)
   a) $y = 2x - 8$
   b) $f(-3) = -14$
   c) $f(20) = 32$

3)
   a) Refinery 1 = x Refinery 2 = y
      $x + y \geq 100$ $2x + 4y \geq 320$ $x + 4y \geq 200$
   b) Graph on Calculator
   c) 40 operations at Refinery 1 and 60 operations at Refinery 2 **OR** 120 operations at Refinery 1 and 20 operations at Refinery 2. Both cost $48,000. Is one a better deal than the other?

4) $x = -1, y = 3, z = 5$

5) 8,000,000

6) Bowls: ${}_{15}C_2 * {}_6C_2 = 1,575$

   Cones: ${}_{15}P_2 * {}_6C_2 = 3,150$

7) a) No Solutions
   b) $\frac{11}{8}$
   c) $x < -4$ or $x > 6$